FIG. 1

DSL TRANSMISSION SYSTEM
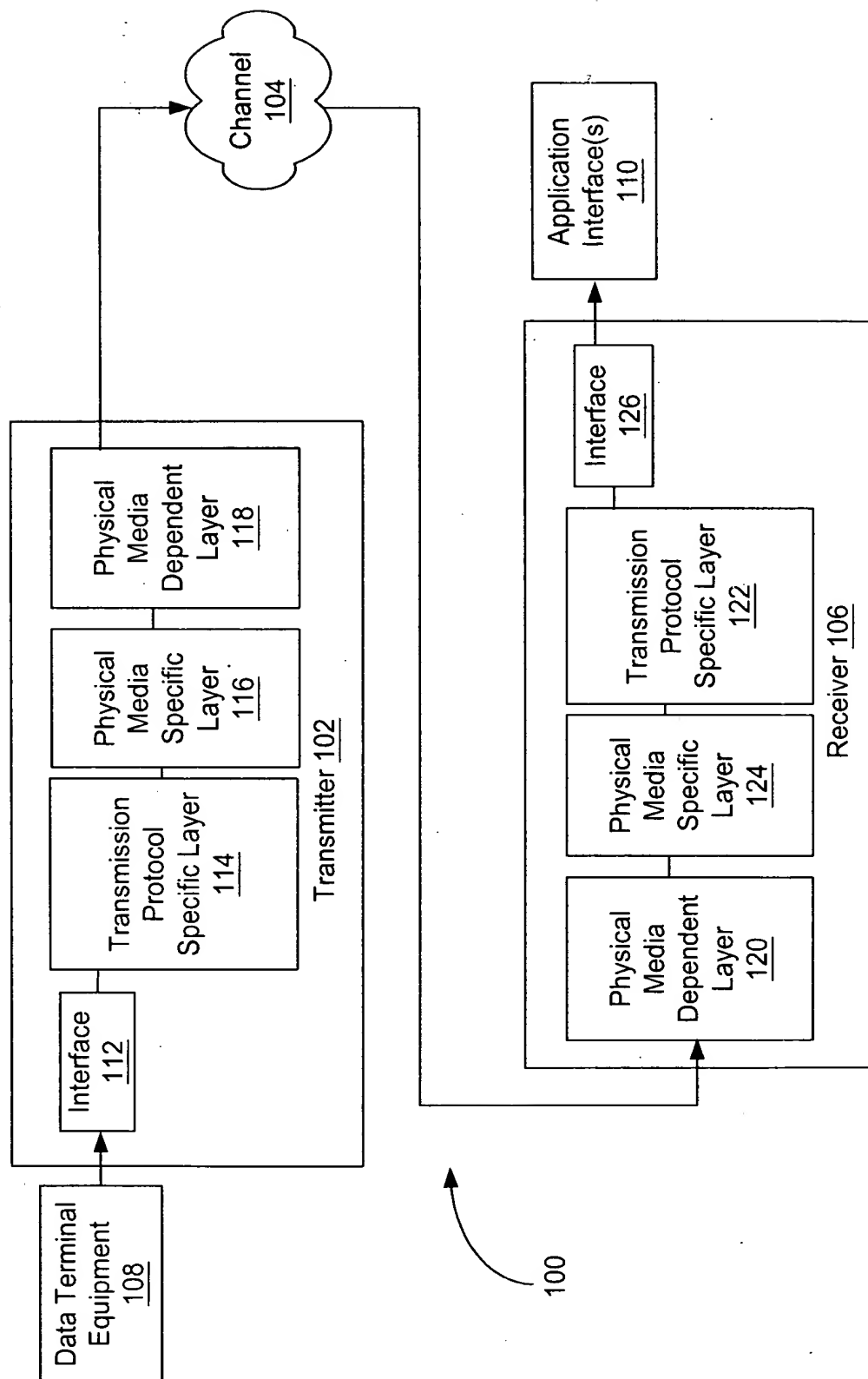
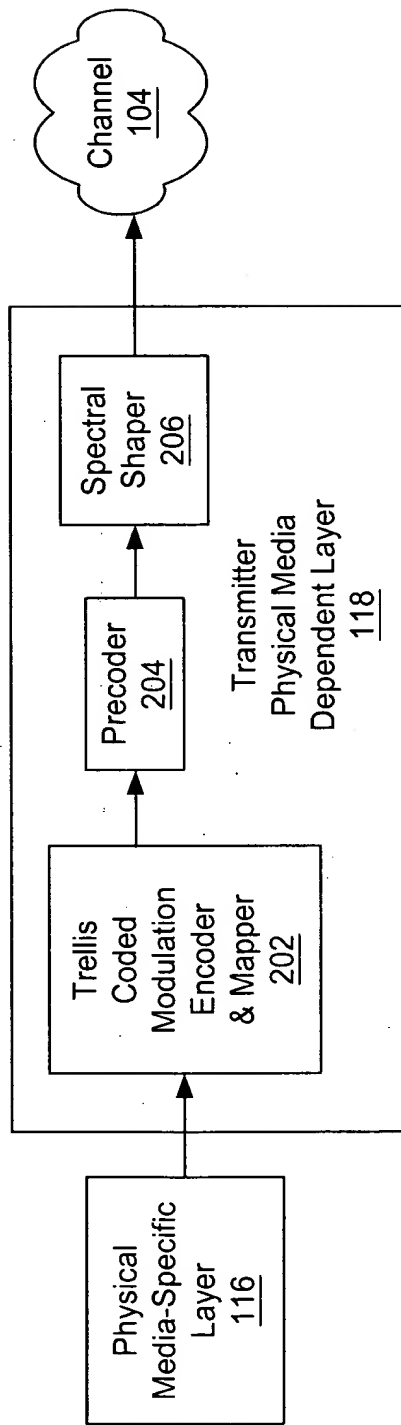FIG. 2

Physical
Media-Specific
Layer
116

Trellis
Coded
Modulation
Encoder
& Mapper
202

Precoder
204

Spectral
Shaper
206

Transmitter
Physical Media
Dependent Layer
118

Channel
104

FIG. 3

TCM Encoder & Mapper 202

Physical Media Specific Layer 116

Serial to Parallel 302

$s(mk+K-1)=X_K(m)$

$s(mk+1)=X_2(m)$

$s(mk+0)=X_1(m)$

Interleaved Generalized Convolutional Encoder 304

Mapper 306

$Y_K(m)$

$Y_2(m)$

$Y_1(m)$

$Y_0(m)$

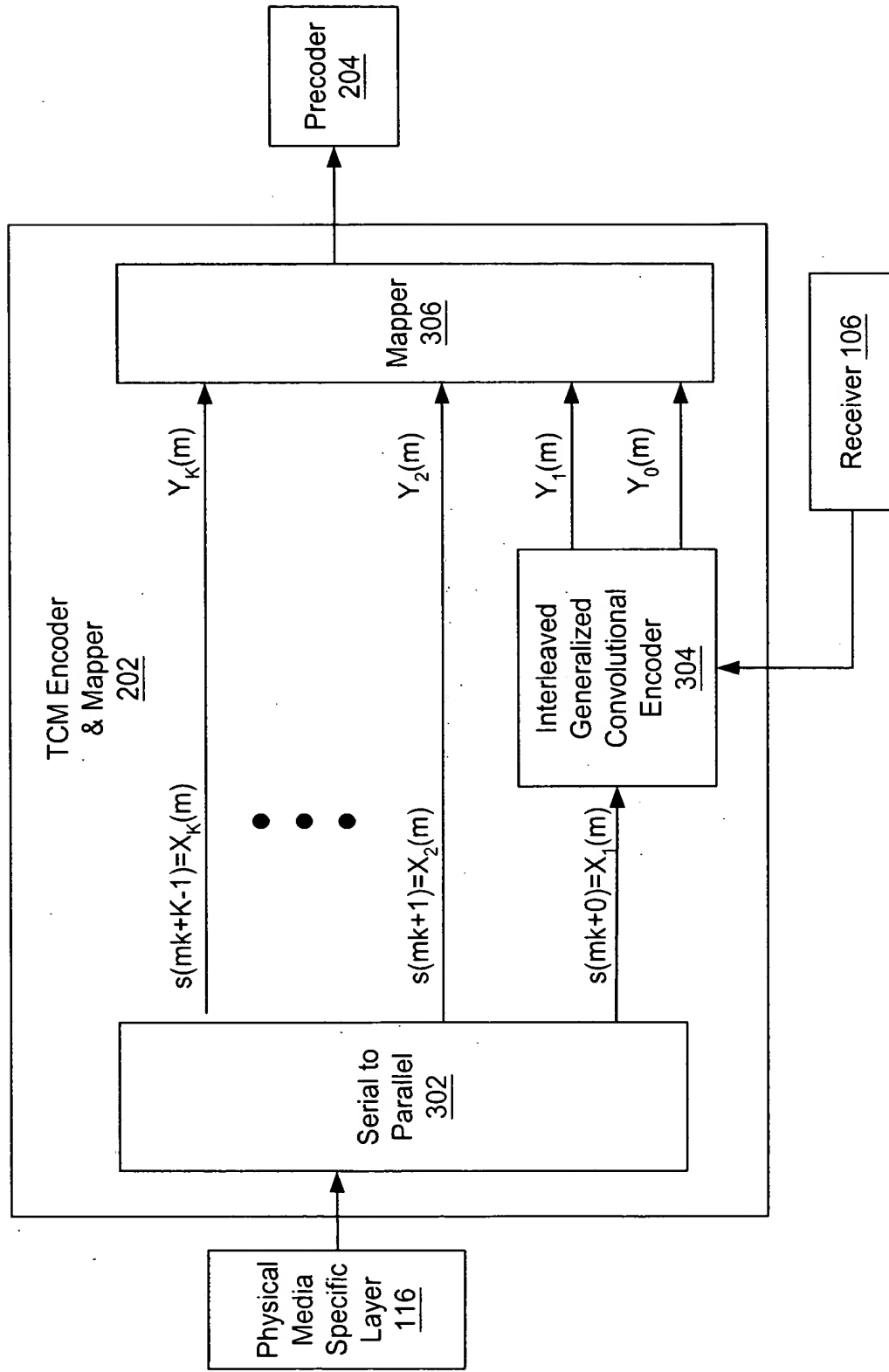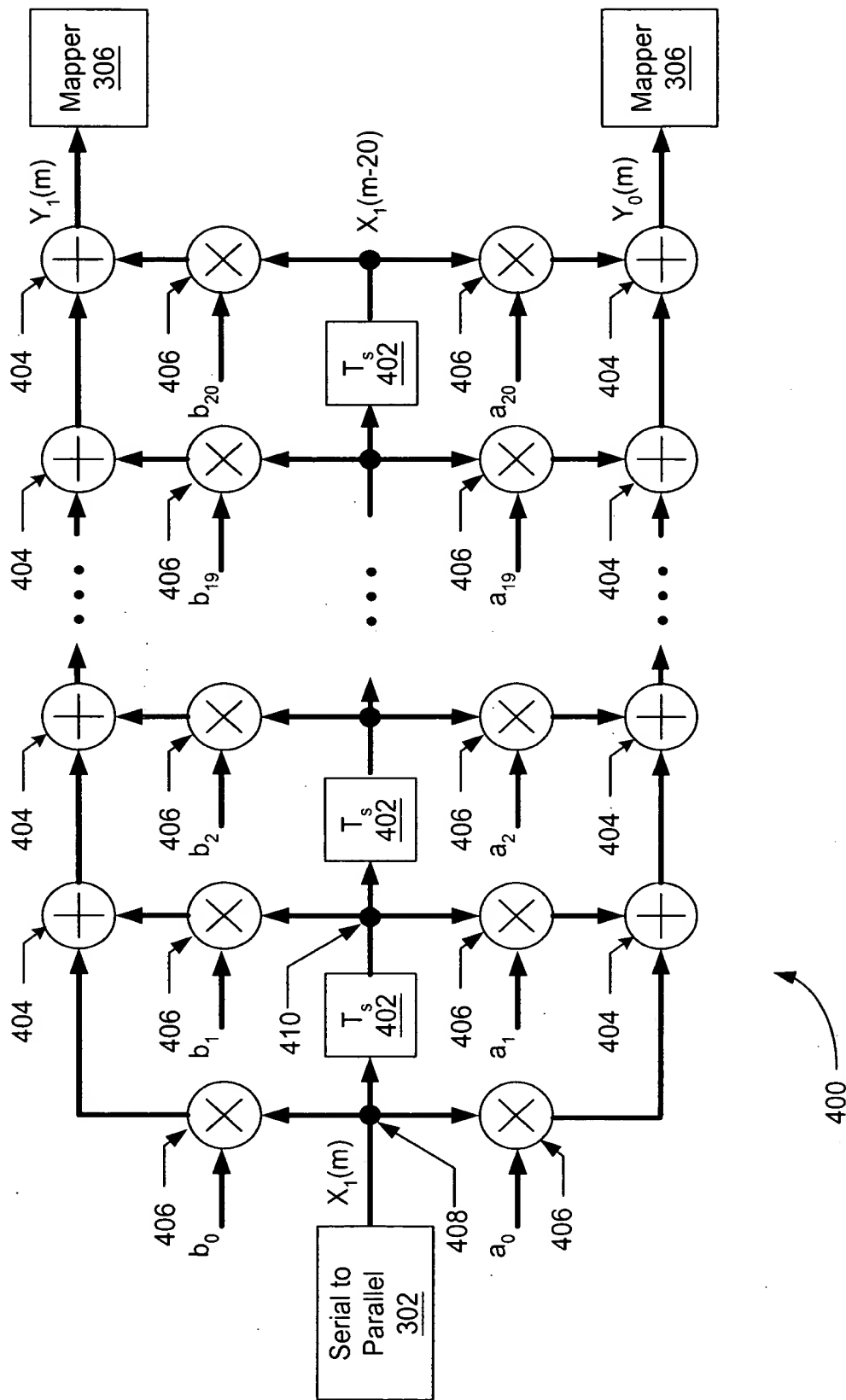Precoder 204

Receiver 106

FIG. 4

Convolutional Encoder
(Prior Art)

400

FIG. 5

Interleaved Generalized
Convolutional Encoder
(First Embodiment)

FIG. 6

Prior
Node
600

Variable Unit
Time Delay MT_s
502

One Symbol
Time Delay
602

One Symbol
Time Delay
602

One Symbol
Time Delay
602

Next
Node
604
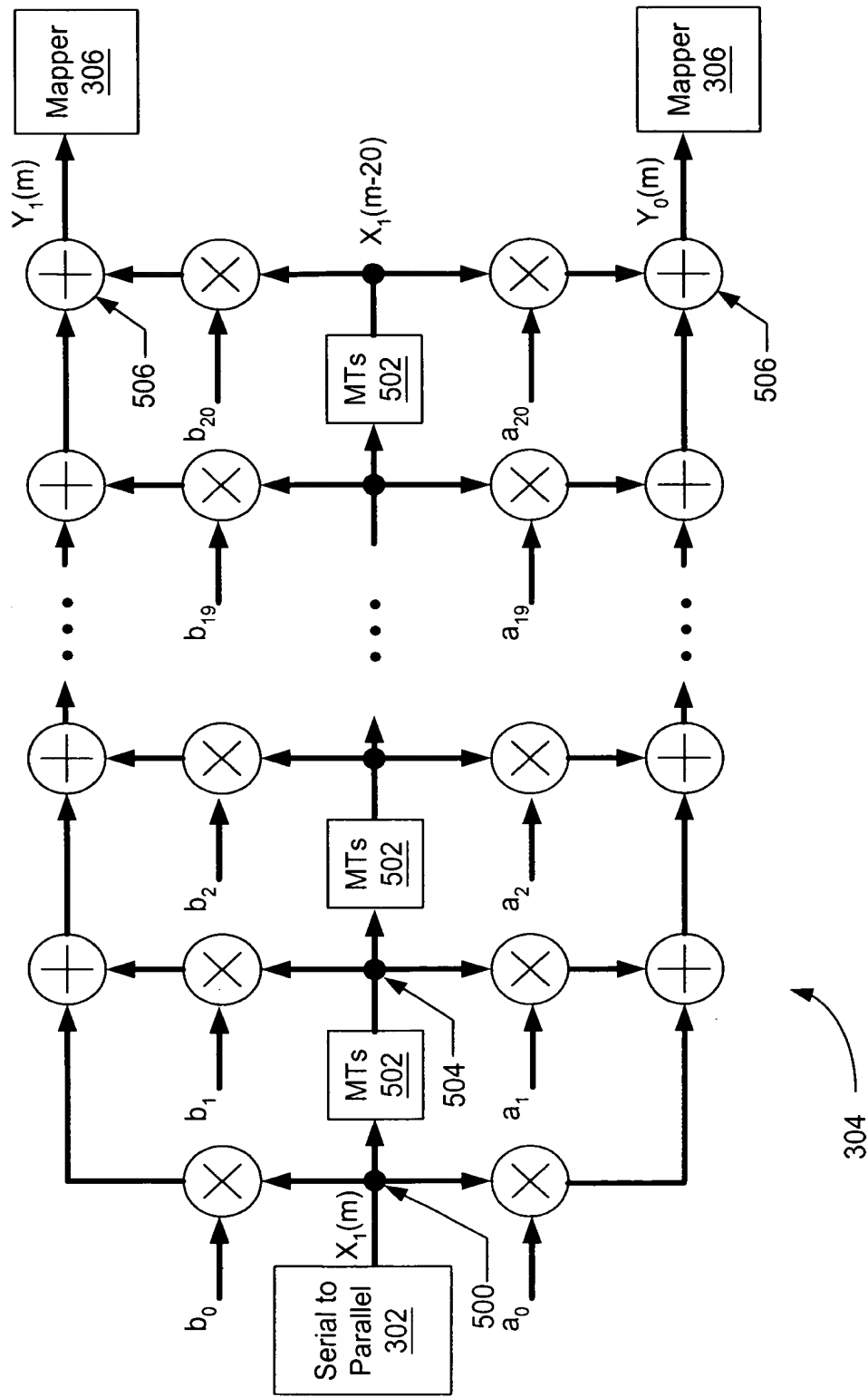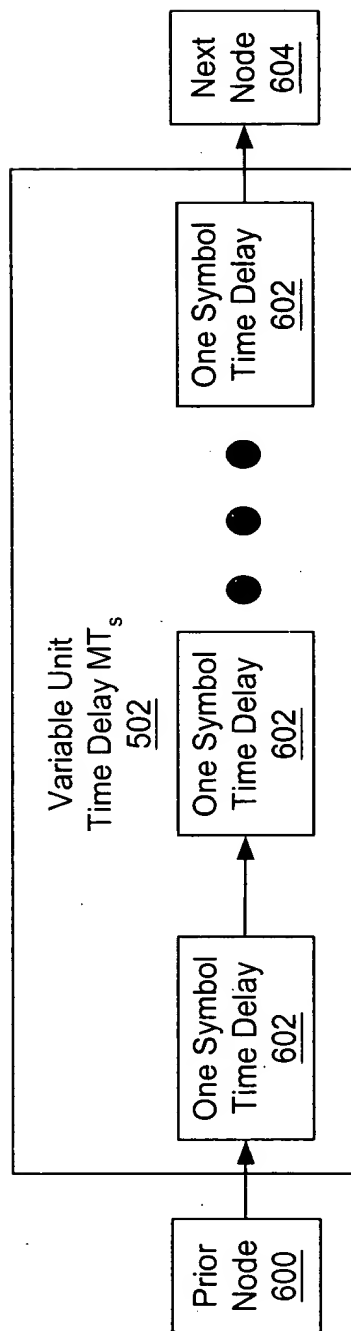
FIG. 7

Activation Frame Format (Prior Art)

Activation Frame Bit LSB:MSB	Definition
1:14	Frame Sync for T_c and T_r: 11111001101011_2, where the left-most bit is sent first in time
15:36	Frame Sync for F_c: 11111001101011_2, where the left-most bit is sent first in time
	Precoder Coefficient 1: 22 bit signed two's complement format with 17 bits after the binary point, where the LSB is sent first in time.
37:58	Precoder Coefficient 2
59:3952	Precoder Coefficients 3 – 179
3953:3974	Precoder Coefficient 180
3975:3995	Encoder Coefficient A: 21 bits where the LSB is sent first in time
3996:4016	Encoder Coefficient B: 21 bits where the LSB is sent first in time
4017:4144	Vendor Data: 128 bits of proprietary information
4145:4211	Reserved: 67 bits set to logical zeros
4212:4227	CRC: c_1 sent first in time, c_{15} sent last in time

FIG. 8

Interleaved Generalized Convolutional Encoder Activation Frame Format

Activation Frame Bit LSB:MSB	Definition
1:14	Frame Sync for T_c and T_r : 1111100110101011_2 , where the left-most bit is sent first in time
	Frame Sync for F_c : 1111100110101011_2 , where the left-most bit is sent first in time
15:36	Precoder Coefficient 1: 22 bit signed two's complement format with 17 bits after the binary point, where the LSB is sent first in time.
37:58	Precoder Coefficient 2
59:3952	Precoder Coefficient 3 –179
3953:3974	Precoder Coefficient 180
3975:3995	Encoder Coefficient A: 21 bits where the LSB is sent first in time
3996:4016	Encoder Coefficient B: 21 bits where the LSB is sent first in time
4017:4024	**Multiplicity of Convolution Encoders, M: 8 bits where the LSB is sent first in time**
4025:4152	Vendor Data: 128 bits of proprietary information
4153:4211	Reserved: **59** bits set to logical zeros
4212:4227	CRC: c_1 sent first in time, c_{15} sent last in time

FIG. 9

Channel
104

Receiver Physical
Media Dependent
Layer
120

ADC &
Forward
Equalizer
902

Noise
Whitening
Filter
904

TCM
Decoder
& Demapper
906

Receiver
Physical
Media Specific
Layer
124

FIG. 10